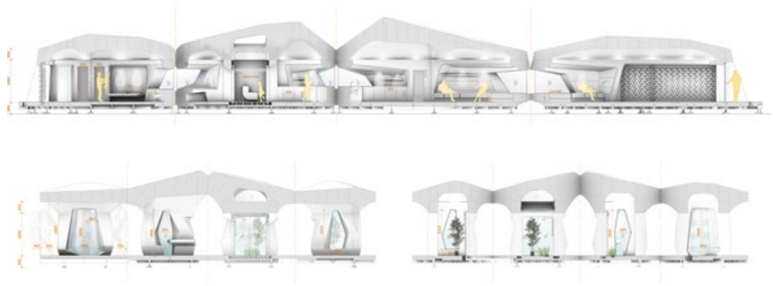
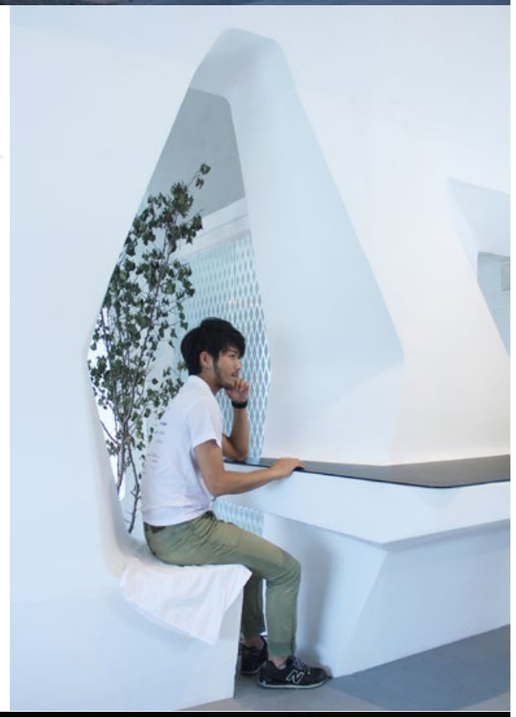
SUNBLOC HOUSE

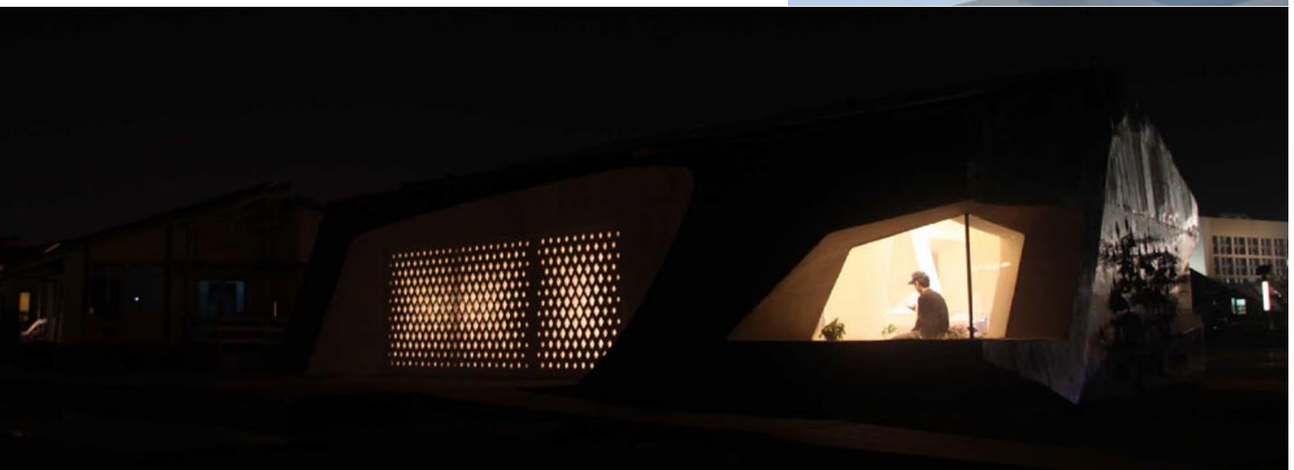
Team Heliomet

Student led Live Project for the Solar Decathlon China 2013

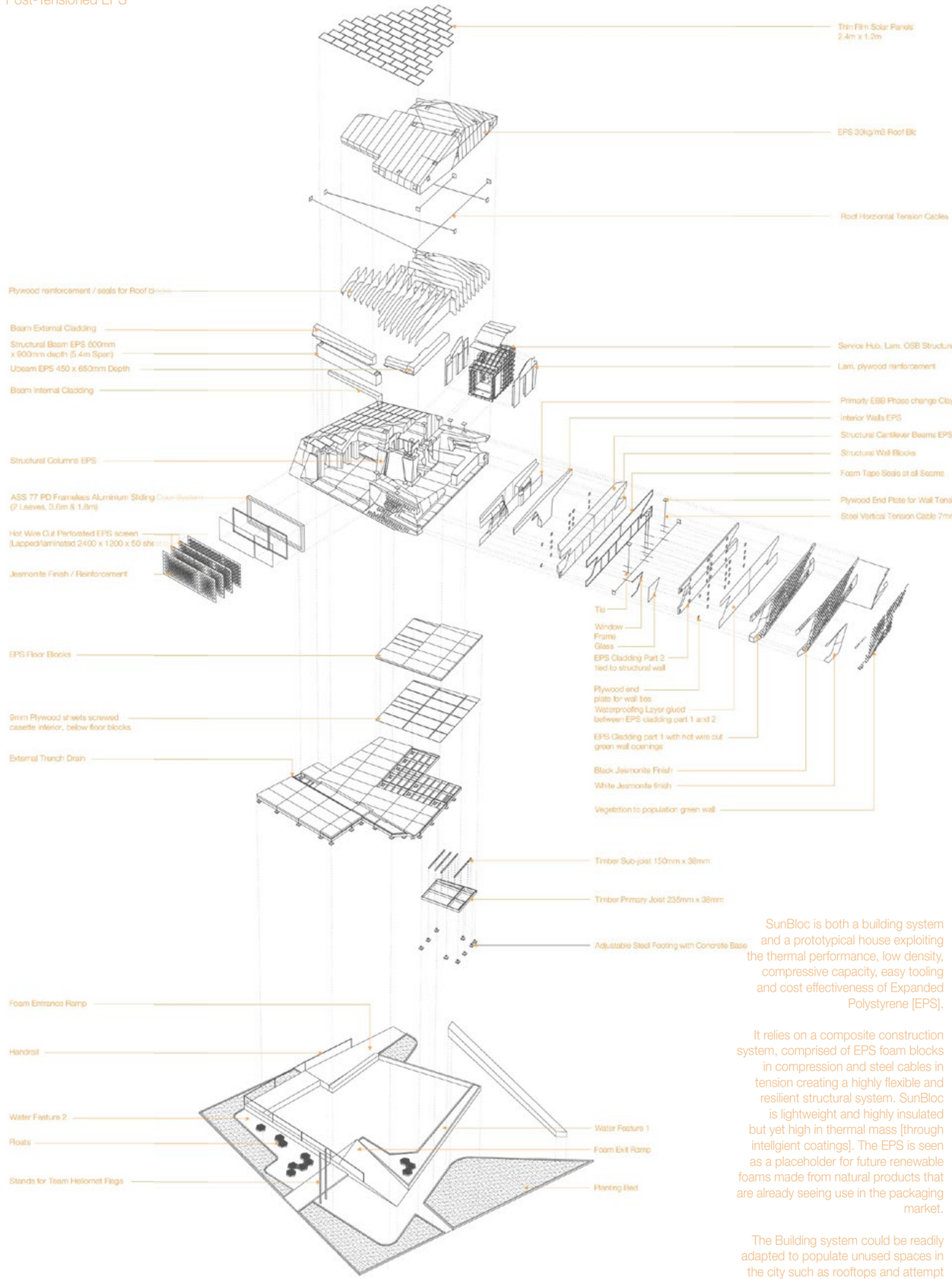
University: London Metropolitan
Client: Solar Decathlon China
Program: Prototypical solar powered house.
Area: 10 sqm







Construction System Overview
Post-Tensioned EPS


Thin Film Solar Panels 2.4m x 1.2m
EPS 30kg/m3 Roof Blc
Roof Horizontal Tension Cables
Plywood reinforcement / seals for Roof bl
Beam External Cladding
Structural Beam EPS 600mm x 900mm depth (5.4m Span)
Ubeam EPS 450 x 650mm Depth
Beam Internal Cladding
Structural Columns EPS
ASS 77 PD Frameless Aluminium Sliding Door System (2 Leaves, 3.6m & 1.8m)
Hot Wire Cut Perforated EPS screen (Lapped/laminated 2400 x 1200 x 50 sht
Jesmonite Finish / Reinforcement
EPS Floor Blocks
9mm Plywood sheets screwed casette interior, below floor blocks.
External Trench Drain
Service Hub, Lam. OSB Structure
Lam. plywood reinforcement
Primarily EBB Phase change Clay
Interior Walls EPS
Structural Cantilever Beams EPS
Structural Wall Blocks
Foam Tape Seals at all Seams
Plywood End Plate for Wall Tension
Steel Vertical Tension Cable 7mm
Tie
Window Frame Glass
EPS Cladding Part 2 tied to structural wall
Plywood end plate for wall ties
Waterproofing Layer glued between EPS cladding part 1 and 2
EPS Cladding part 1 with hot wire cut green wall openings
Black Jesmonite Finish
White Jesmonite finish
Vegetation to population green wall
Timber Sub-joist 150mm x 38mm
Timber Primary Joist 235mm x 38mm
Adjustable Steel Footing with Concrete Base
Foam Entrance Ramp
Handrail
Water Feature 2
Floats
Stands for Team Heliomet Flags
Water Feature 1
Foam Exit Ramp
Planting Bed

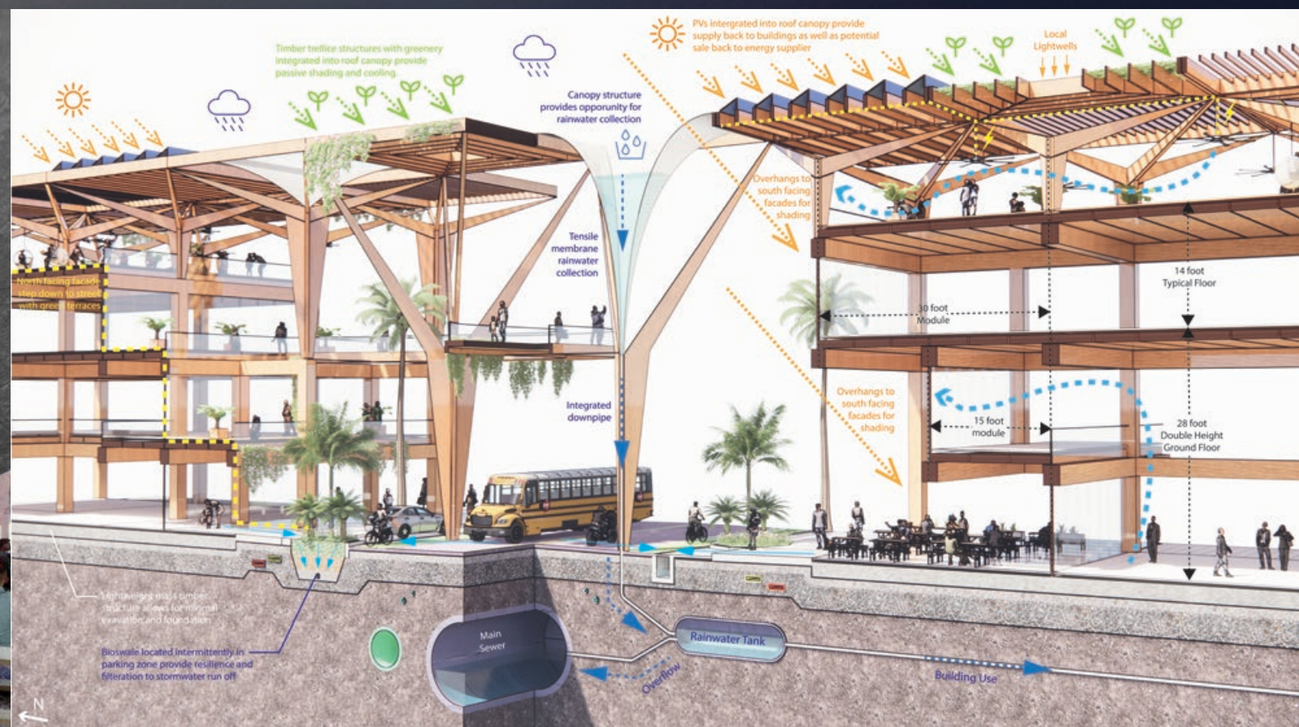
SunBloc is both a building system and a prototypical house exploiting the thermal performance, low density, compressive capacity, easy tooling and cost effectiveness of Expanded Polystyrene [EPS].

It relies on a composite construction system, comprised of EPS foam blocks in compression and steel cables in tension creating a highly flexible and resilient structural system. SunBloc is lightweight and highly insulated but yet high in thermal mass [through intellgient coatings]. The EPS is seen as a placeholder for future renewable foams made from natural products that are already seeing use in the packaging market.

The Building system could be readily adapted to populate unused spaces in the city such as rooftops and attempt to impact the growing housing crisis.

SOWY MASTERPLAN

Location: Wynwood Miami
Program: Mixed Use
Area: 228k sqm
Client: More Development
Architect: Make


PVs intergrated into roof canopy provide supply back to buildings as well as potential sale back to energy supplier
Local Lightwells
Timber trellice structures with greenery integrated into roof canopy provide passive shading and cooling.
Canopy structure provides opporunity for rainwater collection
Overhangs to south facing facades for shading
Tensile membrane rainwater collection
North facing facade stepped down to allow with green terraces
14 foot Typical Floor
10 foot Module
Integrated downpipe
Overhangs to south facing facades for shading
15 foot module
28 foot Double Height Ground Floor
Timber piers made of timber structure allows for minimal excavation and foundation
Bioswale located intermittently in parking zone provide resilience and filteration to stormwater run off
Main Sewer
Rainwater Tank
Overflow
Building Use
N

HELIOCELL
IAAC

Student led Live Project at the Institute for Advanced Architecture of Catalonia.

University: IAAC
Location: Barcelona
Program: Shelter with dynamic shading.

40 LEADENHALL

Location:	City of London
Program:	Workplace, Retail, F&B
Area:	85k sqm
Client:	M&G Prudential, Nuveen
Architect:	Make
Main Contractor:	Mace Group
Facade Contractor:	Focchi
Procurement:	Design & Build
Workstages:	4-6

View to city cluster at Sunrise
looking from Canary Wharf

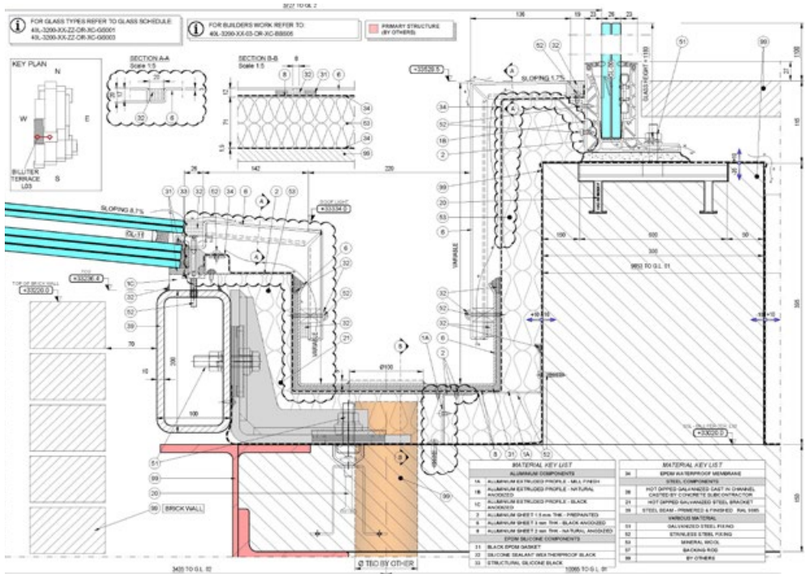
East Facade
Helicopter view

North Tower East Facade,
looking from Aldgate Square

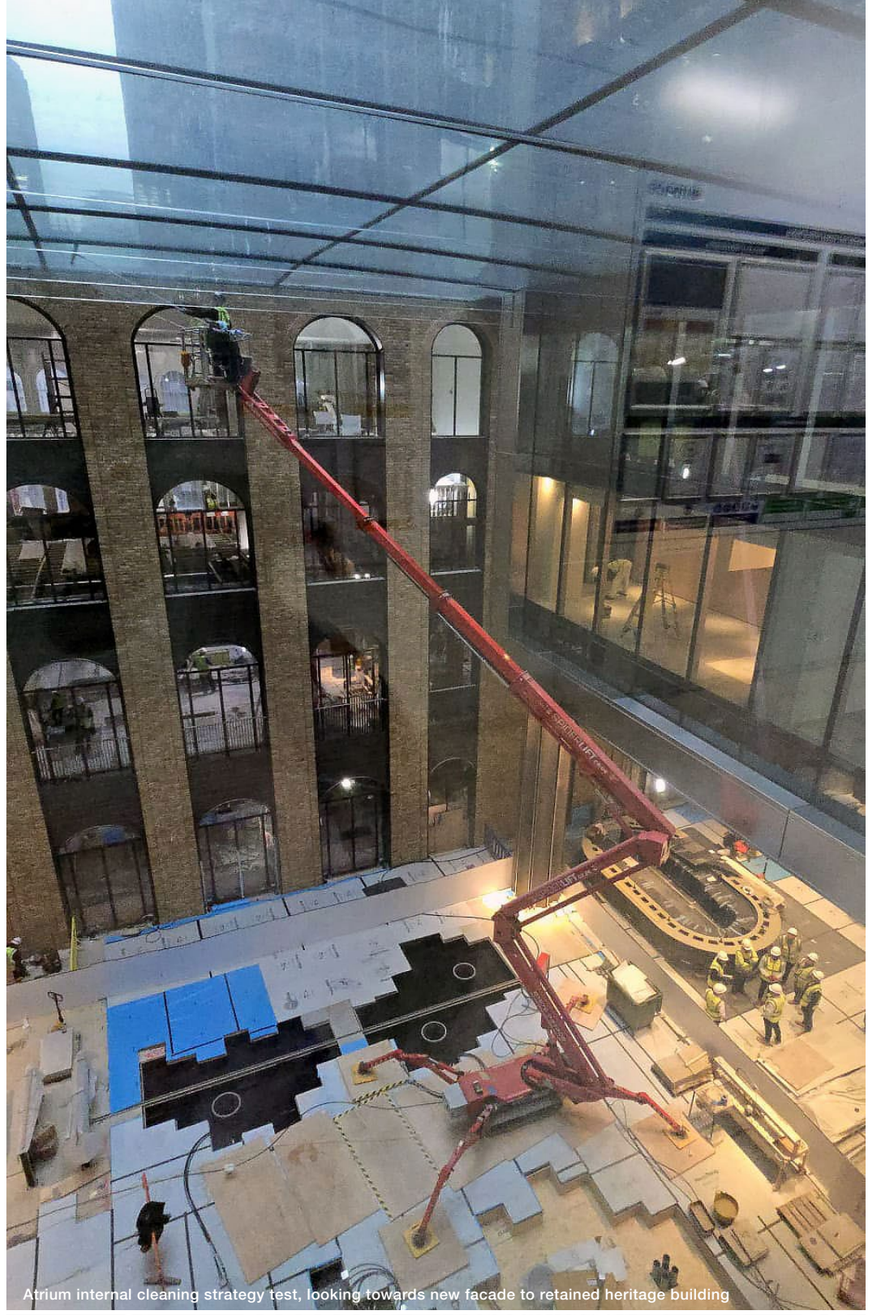
Visual Mock Up - Ground Floor South Facade bay and Soffit
VINCI Technology Centre, Leighton Buzzard

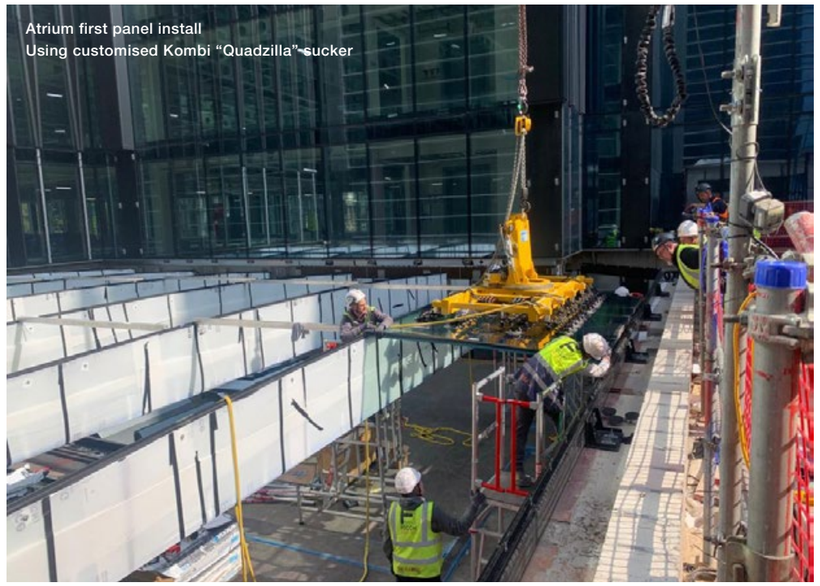
Visual Mock Up - Curtain Walling Panel Types
VINCI Technology Centre,Leighton Buzzard

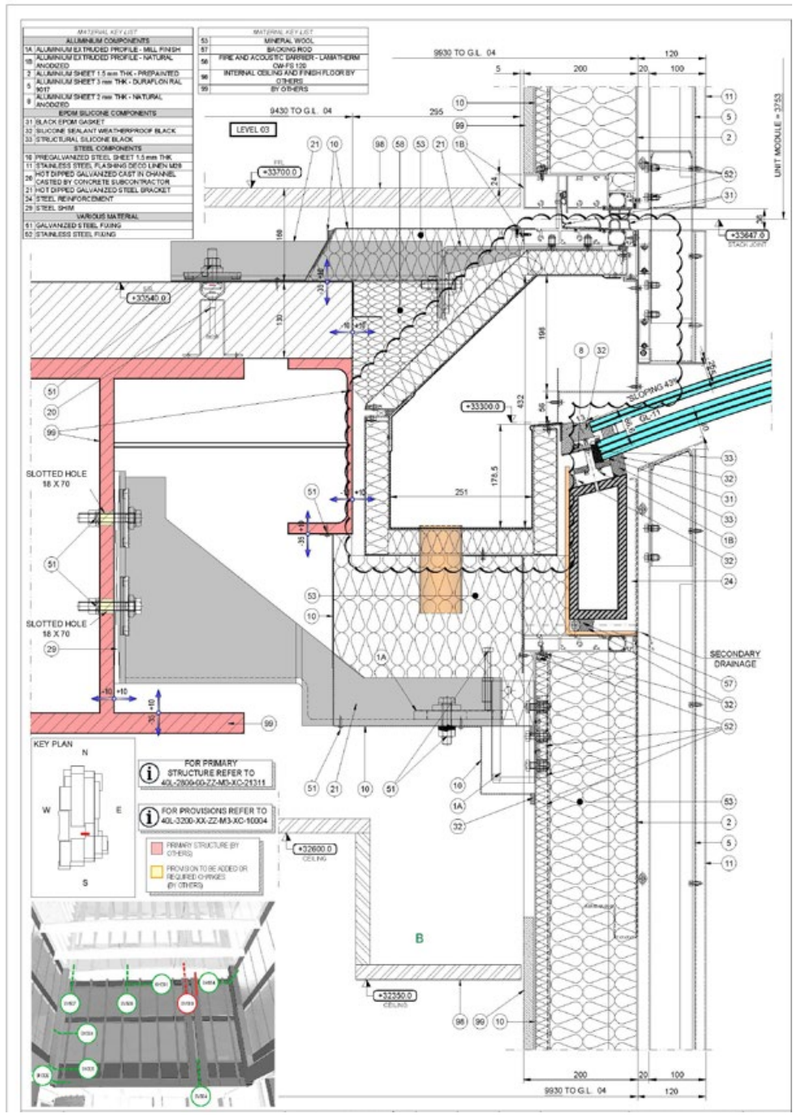
Visual Mock Up - Typical Terrace floor interface
VINCI Technology Centre,Leighton Buzzard



Atrium Interface to new internal facade/roof, rear of retained hertitage building



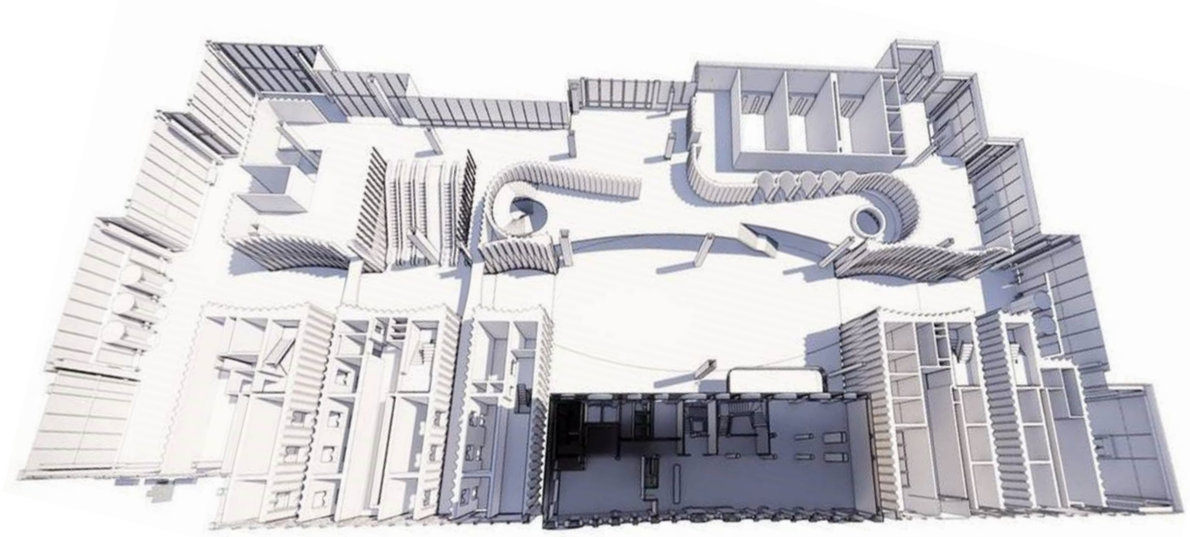




Atrium interface to Tower with hidden gutter detail

Concept model for approved ground floor scheme, presented to M&G in Feb 2020
Hybrid physical model of 3d printed, laser cut and traditionally made elements, with lighting.

Series of 3d printed maquettes testing fluted geometry in various areas of the ground floor

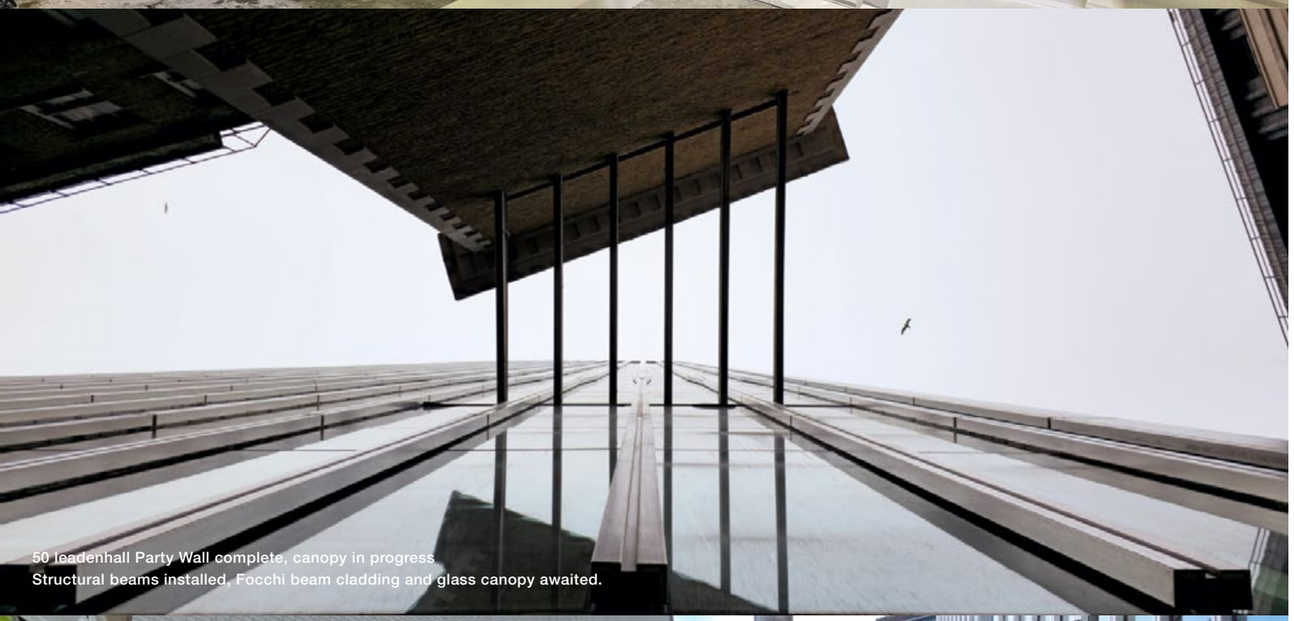


First digital model of approved ground floor concept, in Rhino 3d

Mock up of rationalised flute geometry, cut tube principle at Littlehampton Welding

Ground Floor Central Space
Section 4A Inspection

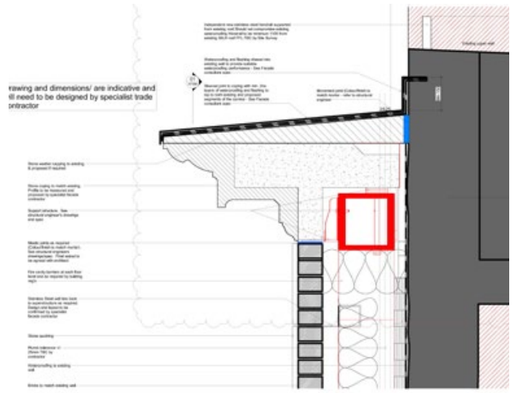
GRC Cornice mock up
Chiltern factory, Chesterfield

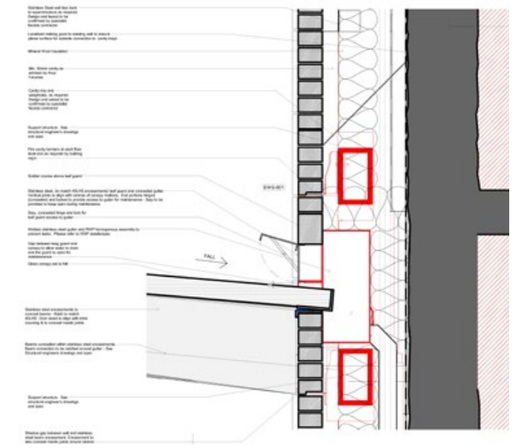


50 leadenhall Party Wall complete, canopy in progress
Structural beams installed, Focchi beam cladding and glass canopy awaited.

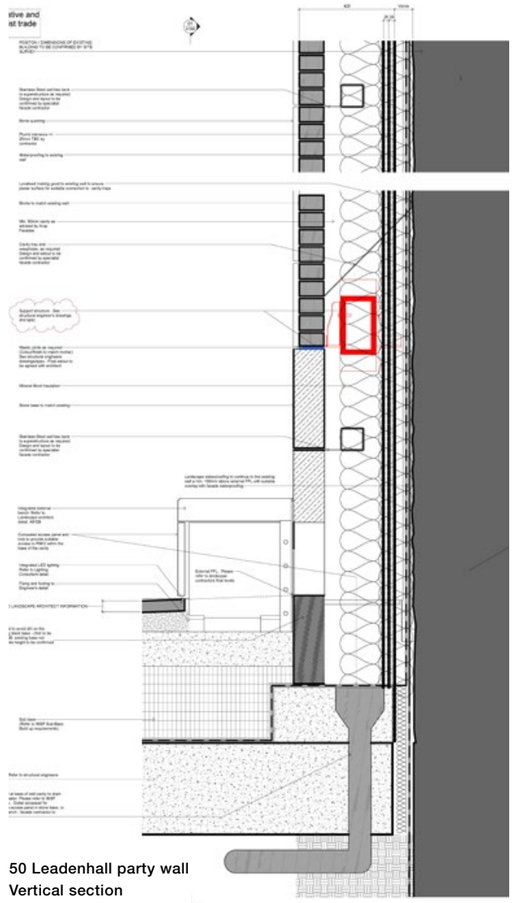
Lead flashing onto GRC cornice at top of new 50 Leadenhall party wall

50 Leadenhall Party Wall
Northern Entrance to Fenchurch St





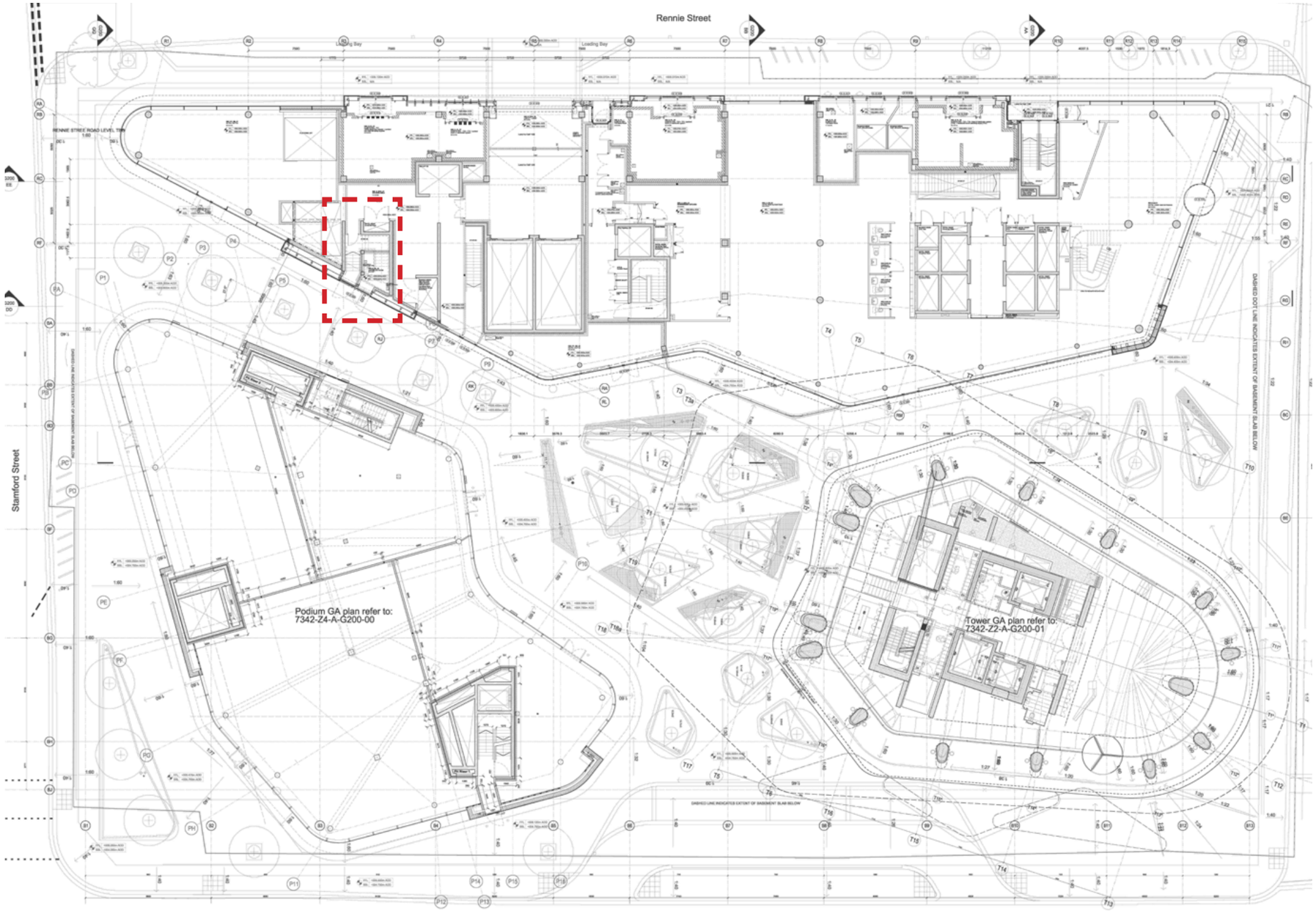
Diagrammatic CGI



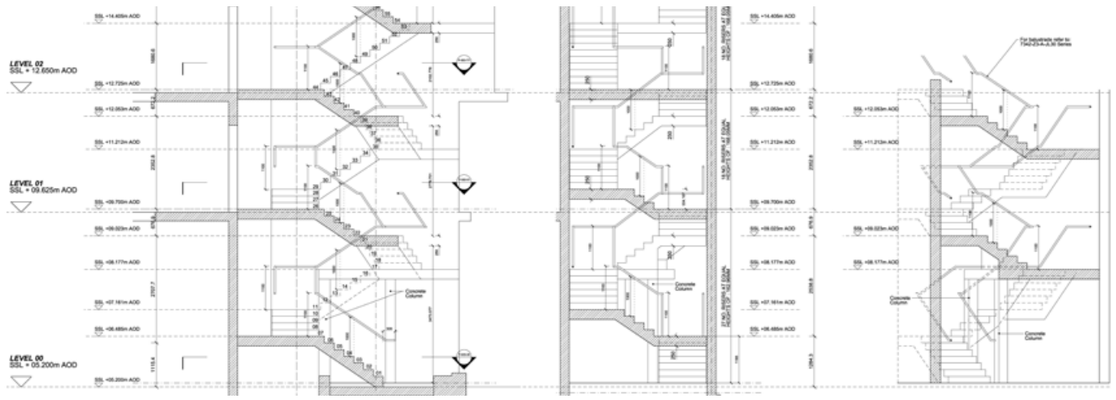
50 Leadenhall party wall
Vertical section

ONE BLACKFRIARS

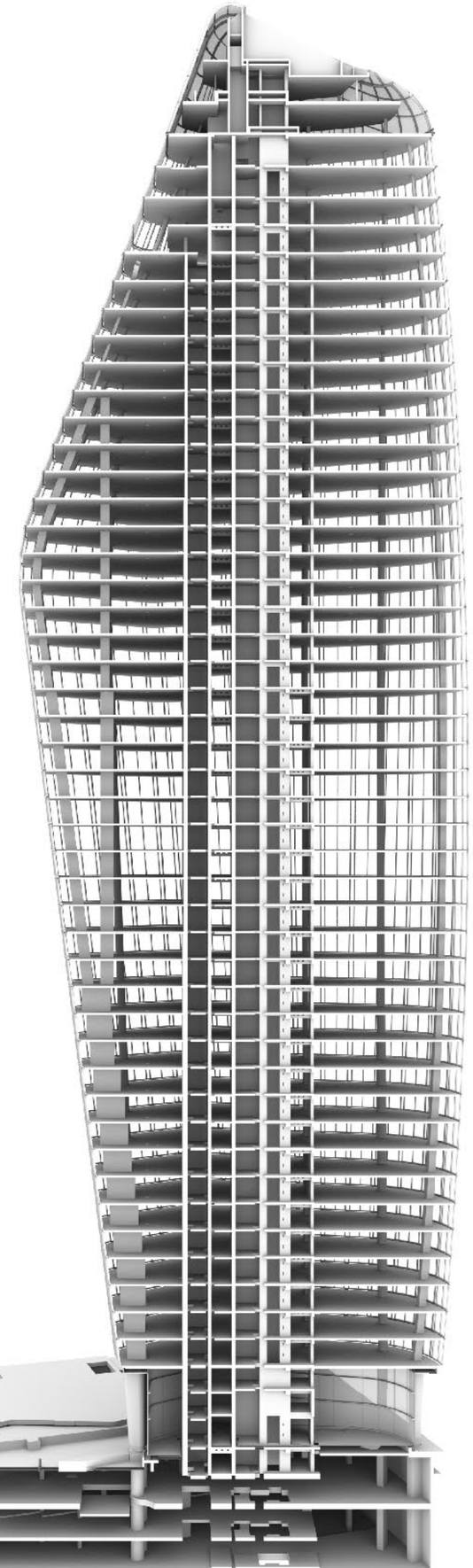
Location:	Blackfriars London
Program:	Luxury Residential, Hotel, Retail
Area:	69k sqm
Client:	St. George
Architect:	SimpsonHaugh
Main Contractor:	Multiplex
Facade Contractor:	Yuanda
Procurement:	Design & Build
Workstages:	4-6



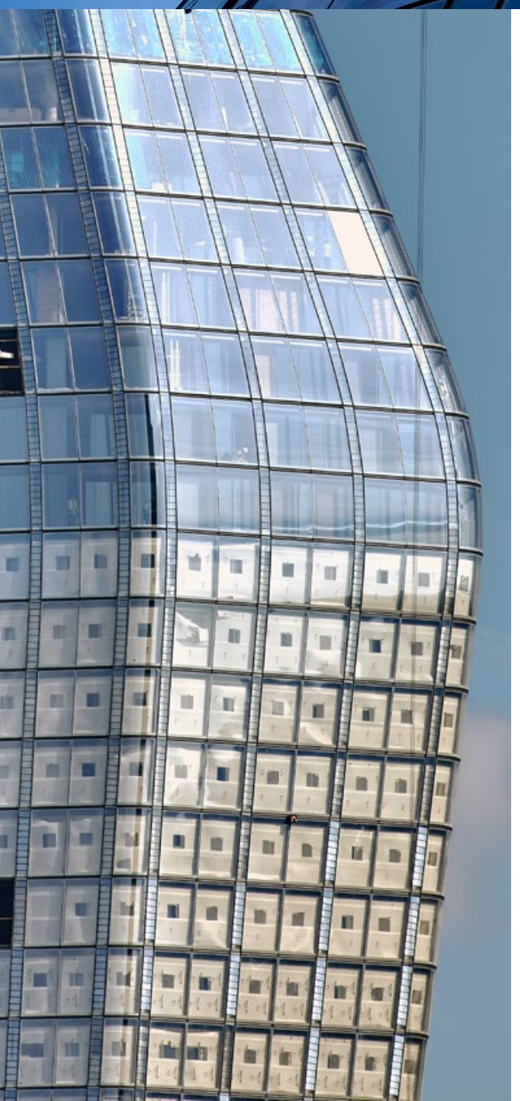
Site plan, Ground

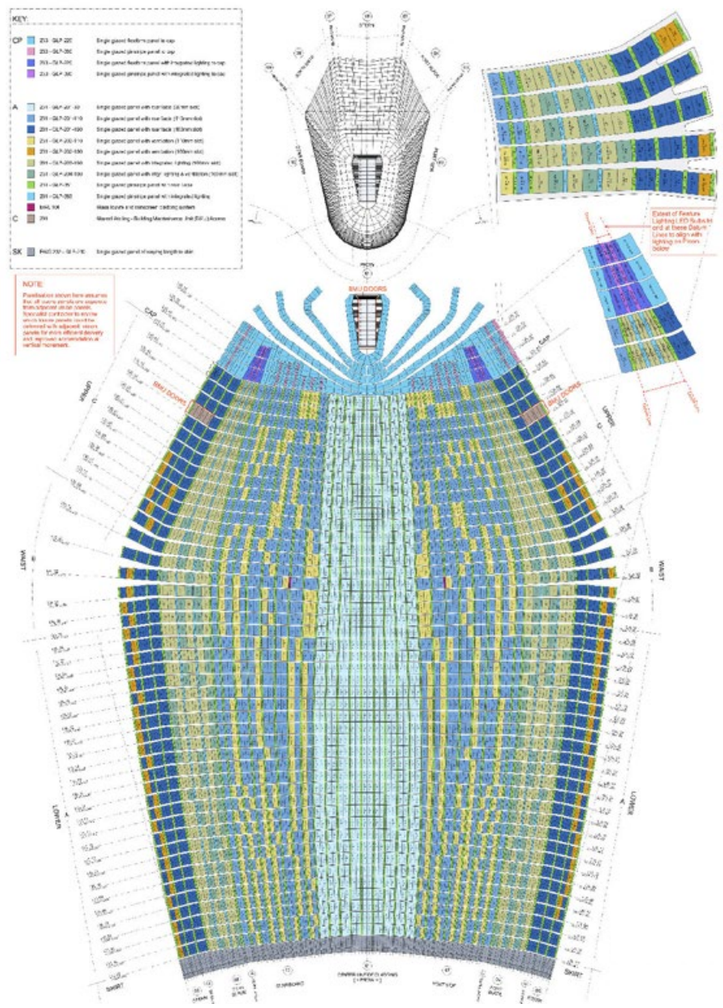


Hotel Stair 08, Sections

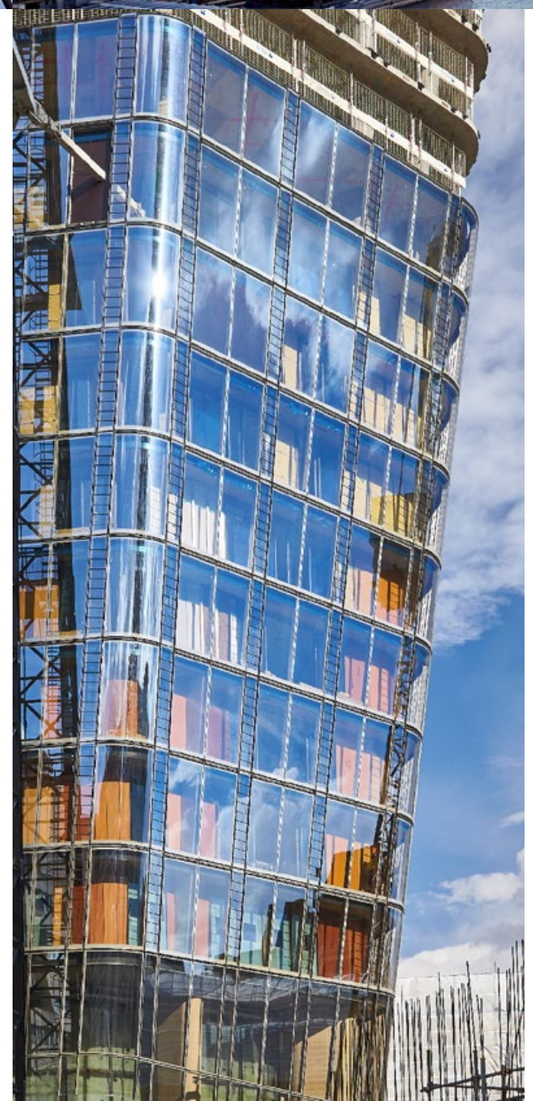


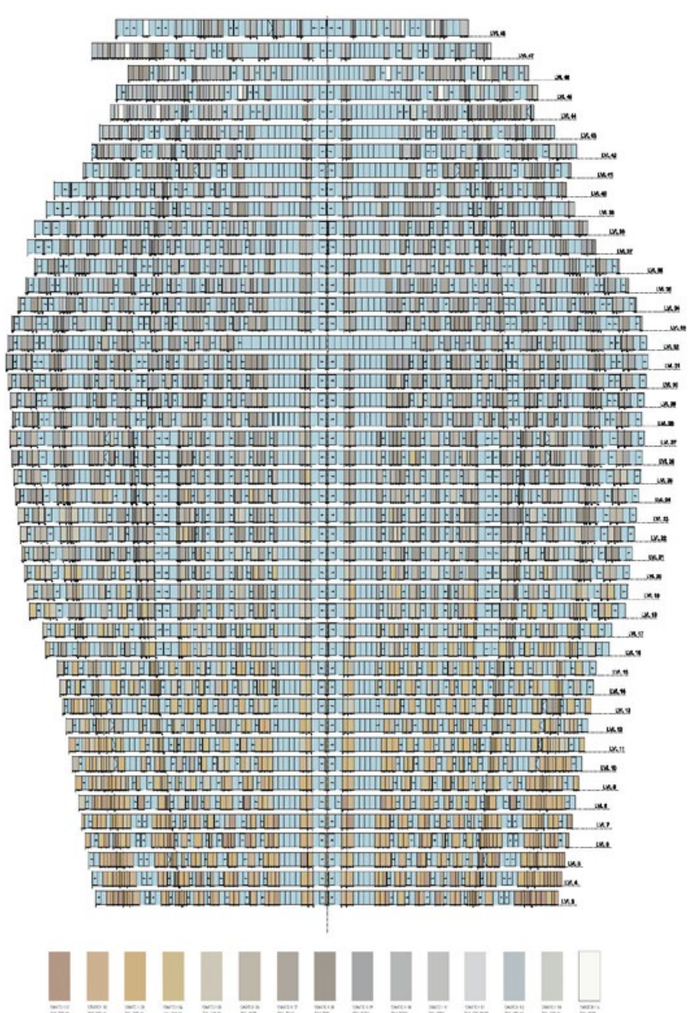
Shell and Core model
Rhino / Grasshopper / Aecosim



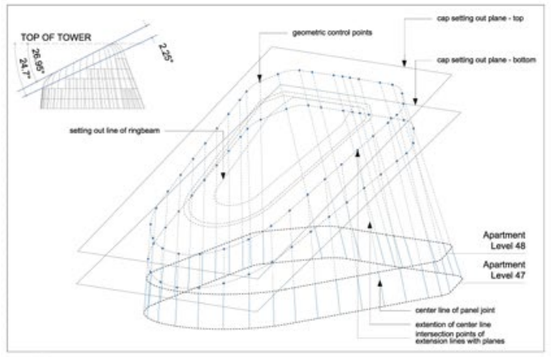


Outer Skin, Unwrapped Elevation

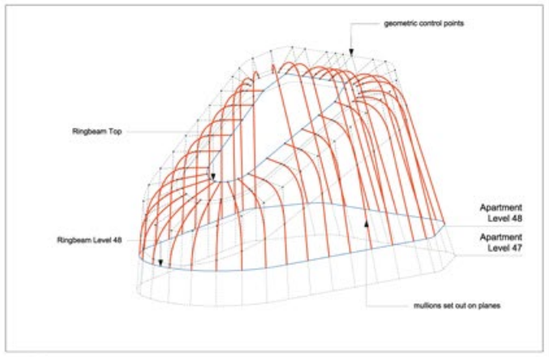




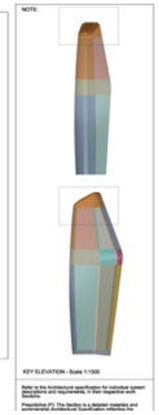
Inner Skin, Unwrapped Elevation


TOP OF TOWER
24.7°
26.95°
2.25°
geometric control points
cap setting out plane - top
cap setting out plane - bottom
setting out line of ringbeam
Apartment Level 48
Apartment Level 47
center line of panel joint
extention of center line intersection points of extension lines with planes

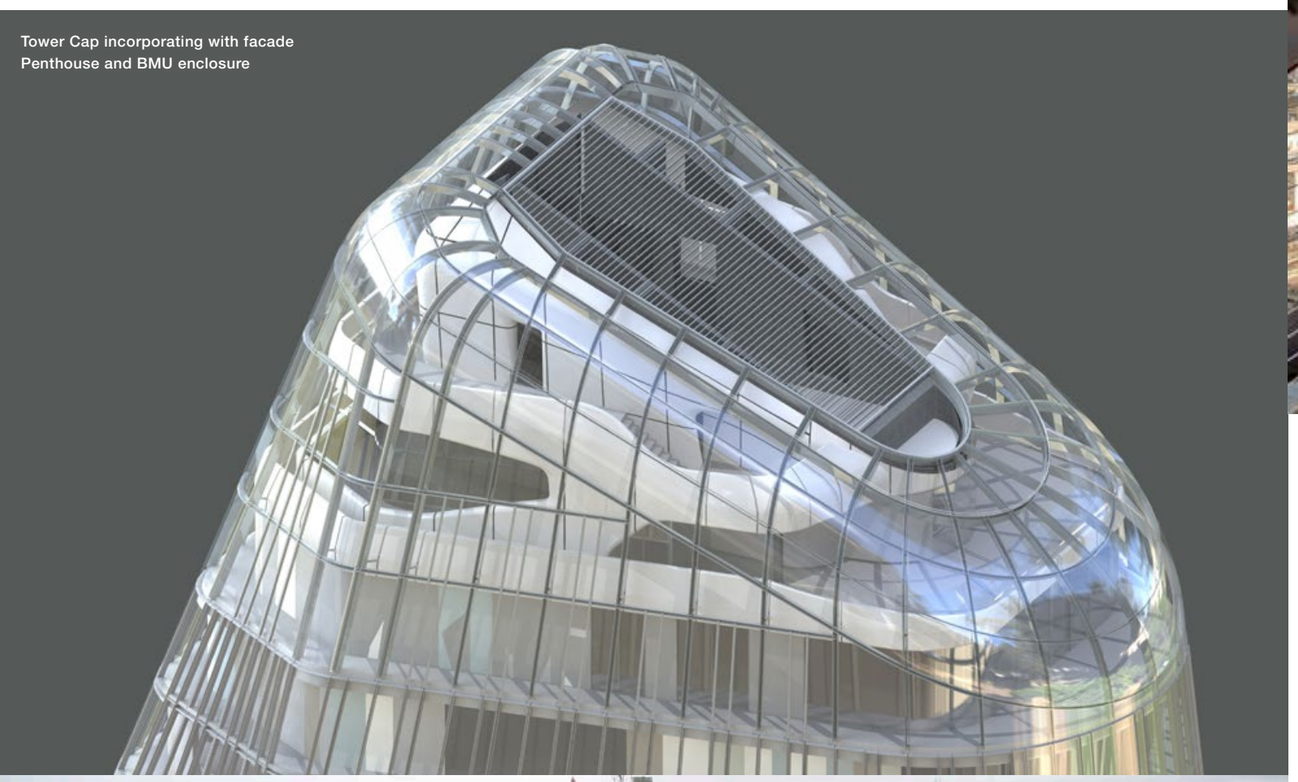
01 Isometric View
Current Structural Frame - mullion and transom planes



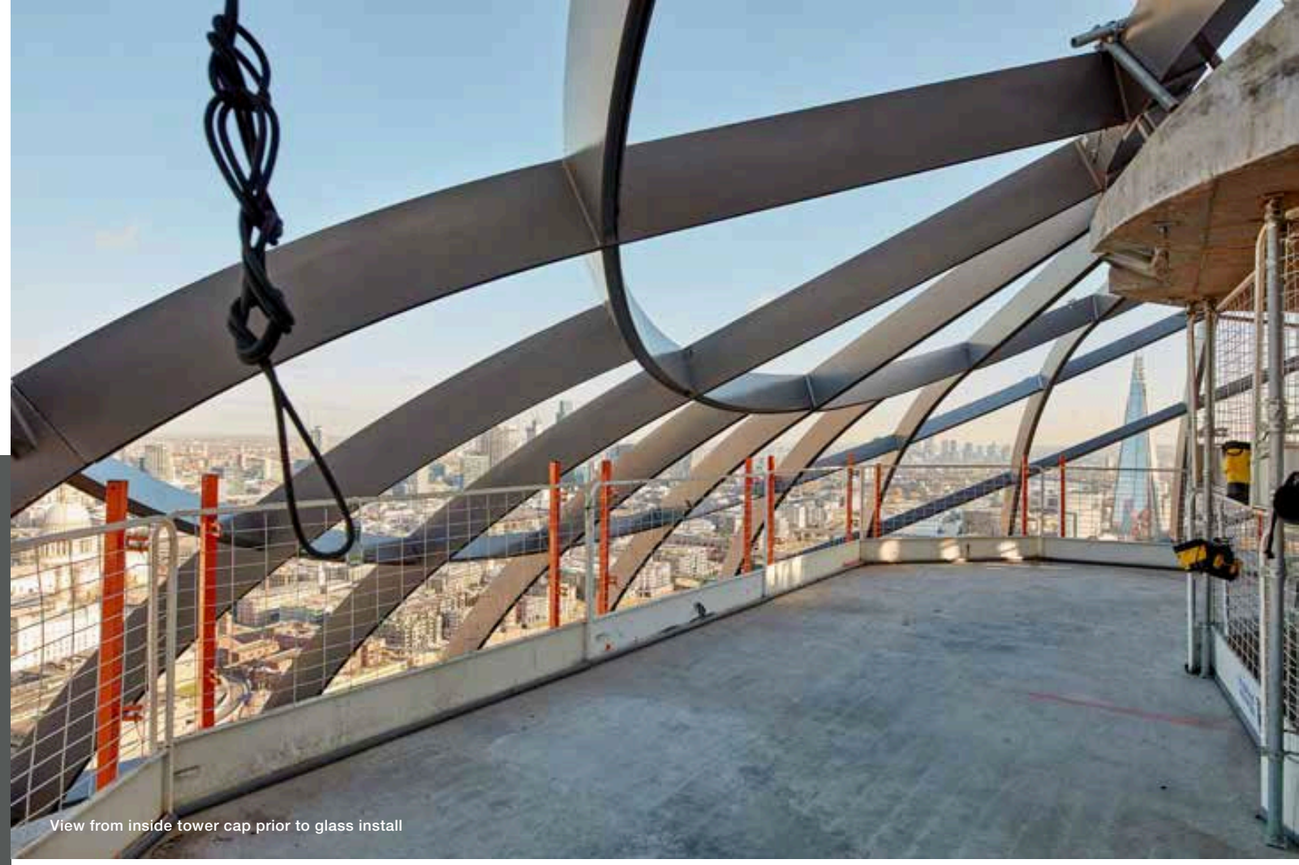
02 Isometric View
Current Structural Frame - mullion and transom planes



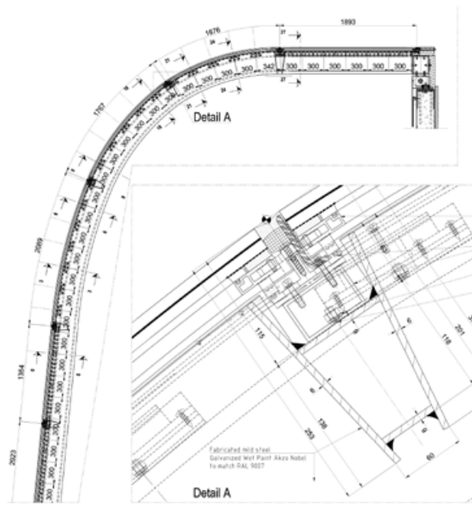
Tower Cap incorporating with facade Penthouse and BMU enclosure

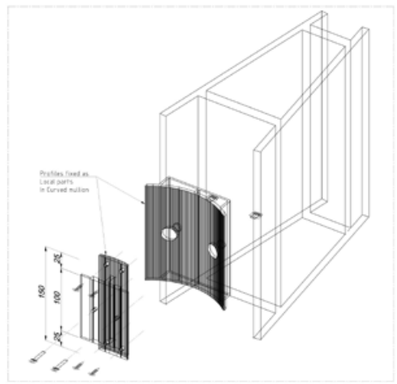


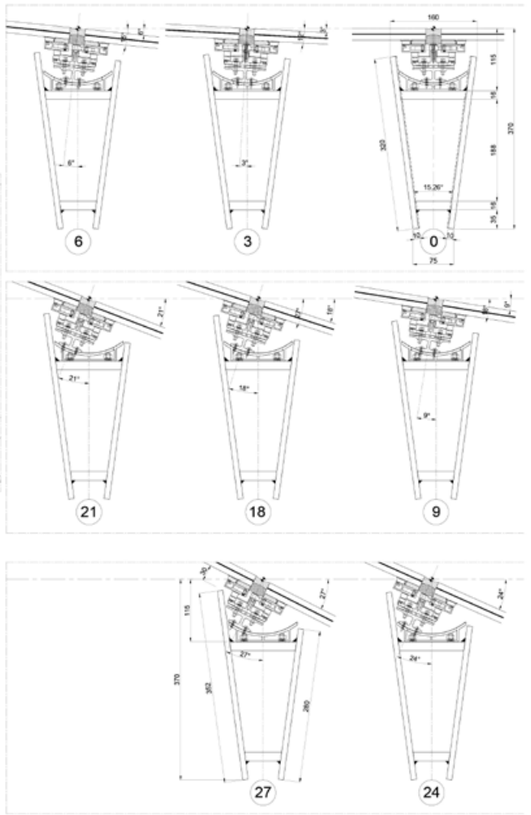
Facade install approaching cap



View from inside tower cap prior to glass install



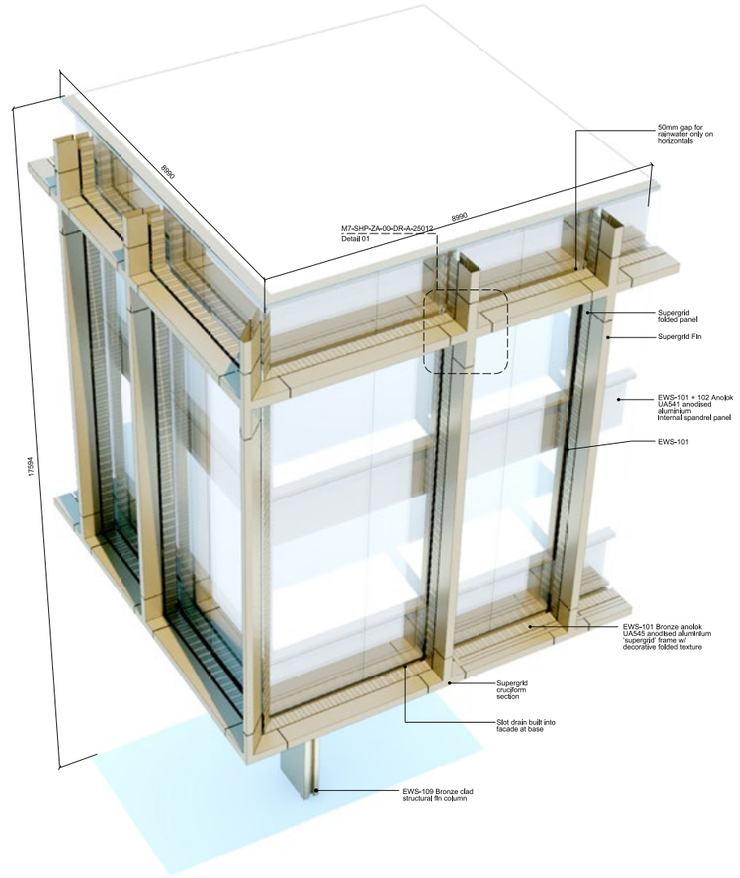


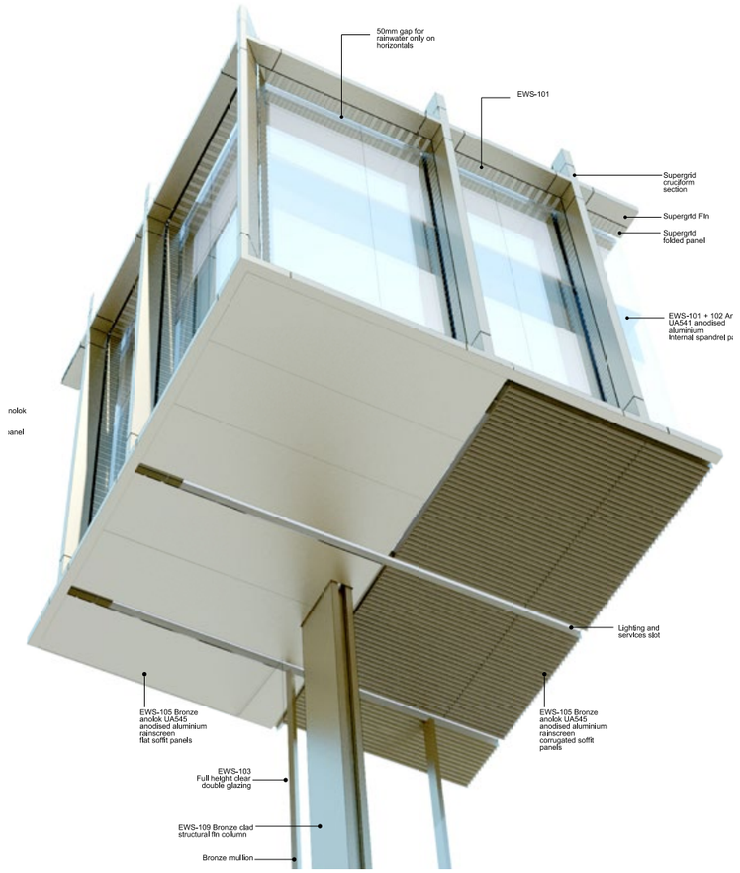


Yuanda proposal for mullion interface to glass cap
to allow adaption to extreme geometric conditions encounter in cap

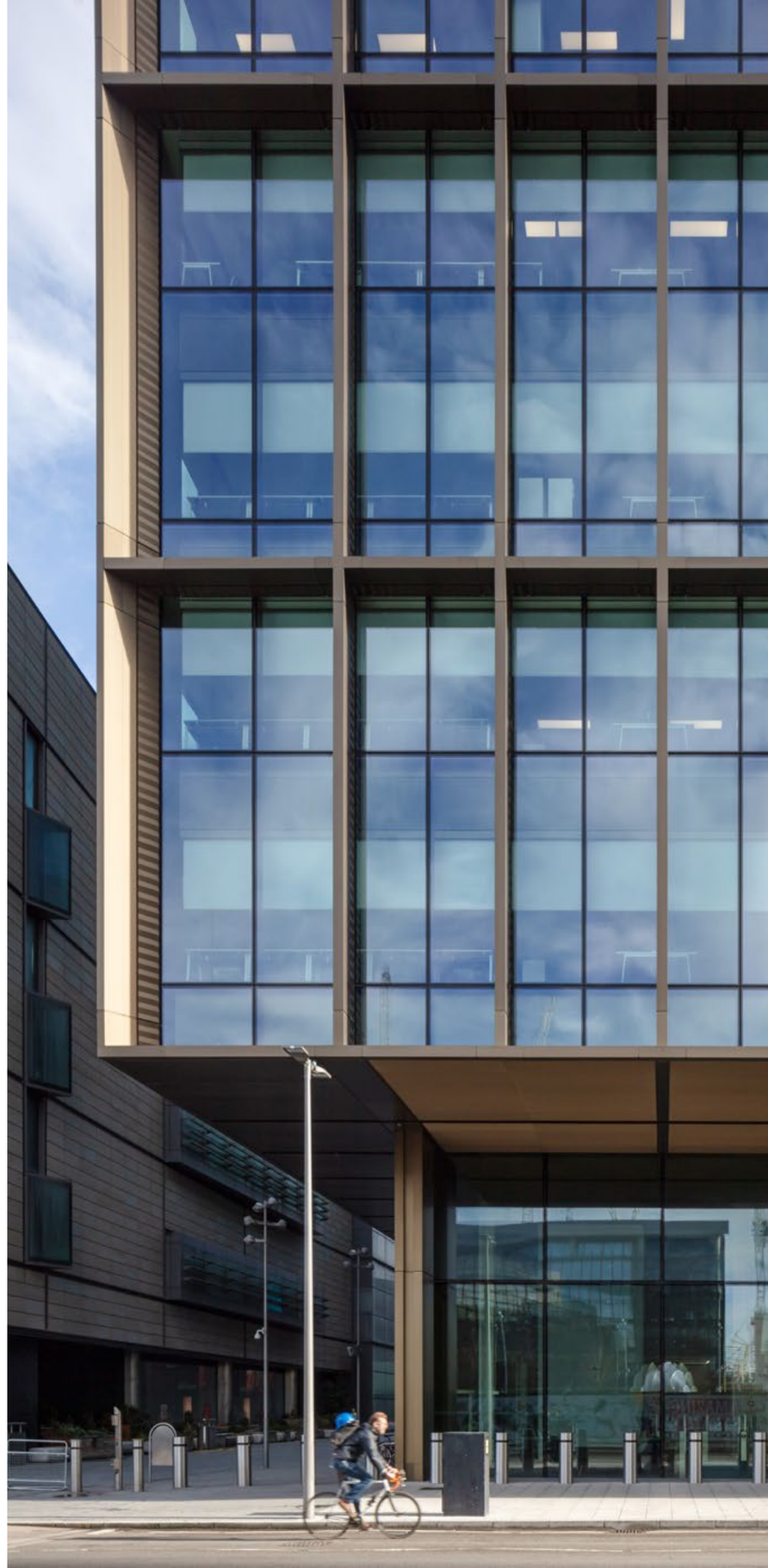
14 WESTFIELD AVENUE

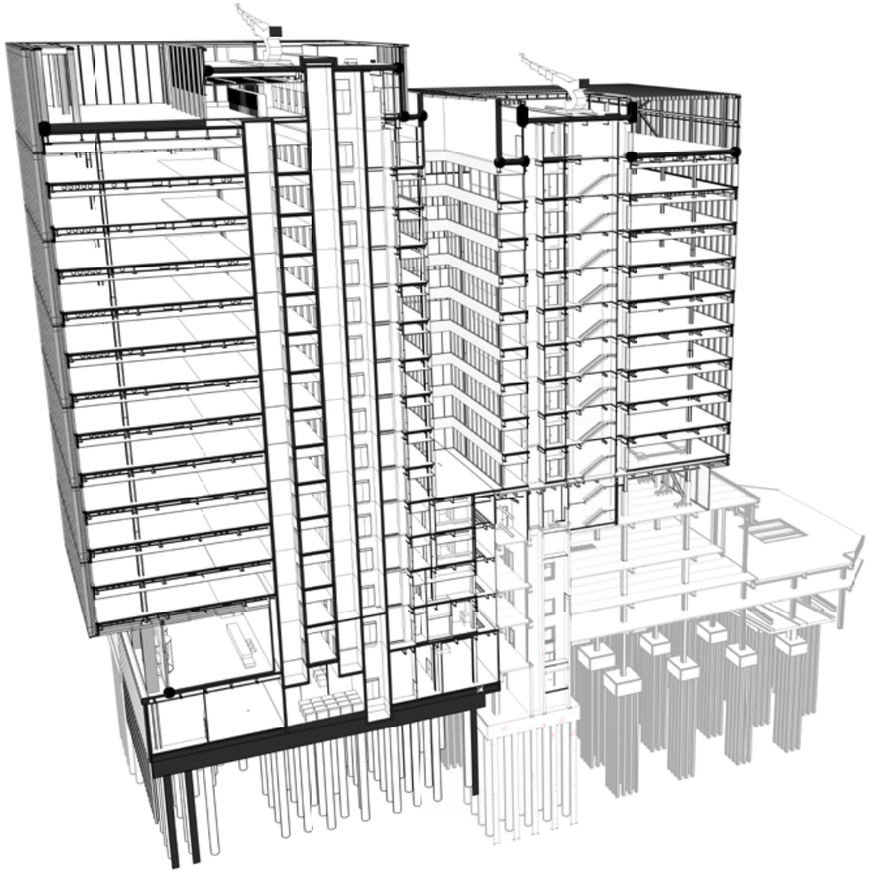
Location:	Stratford
Program:	Office, Retail
Area:	84k sqm
Client:	Westfield Europe Limited
Architect:	Simpsonhaugh
Main Contractor:	Westfield Europe Limited
Facade Contractor:	Focchi
Procurement:	Design and Build


8990
8990
17594
M7-SHP-ZA-00-DR-A-25012
Detail 01
50mm gap for rainwater only on horizontals
Supergrid folded panel
Supergrid Fin
EWS-101 + 102 Anolok UA541 anodised aluminium Internal spandrel panel
EWS-101
EWS-101 Bronze anolok UA545 anodised aluminium 'supergrid' frame w/ decorative folded texture
Supergrid cruciform section
Slot drain built into facade at base
EWS-109 Bronze clad structural fin column

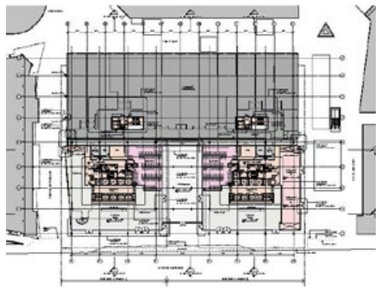


Facade 3d Sectional Diagrams

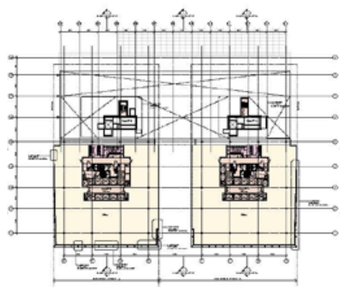




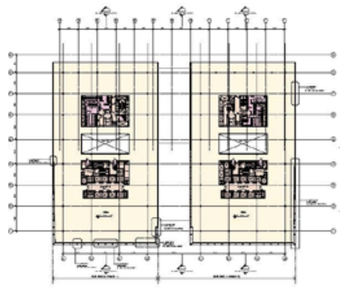
Key section illustrating step onto retained existing building (in grey)



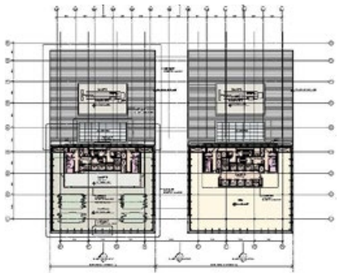
Ground



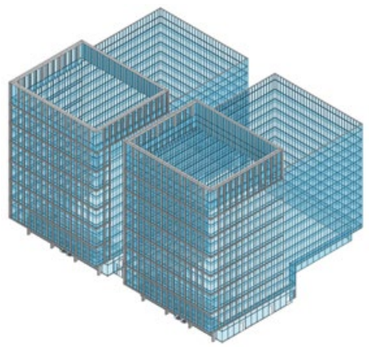
Typical Half Floor



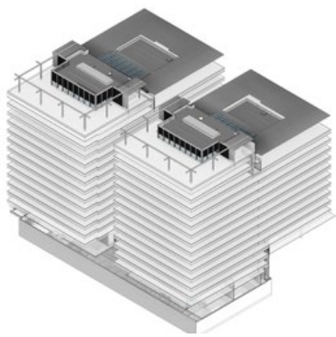
Typical Full Floor



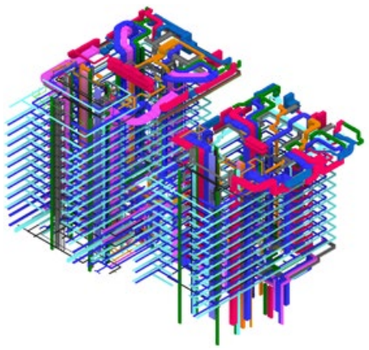
Roof Garden



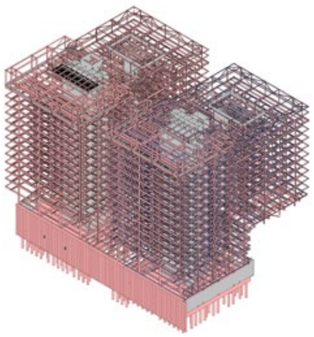
Facade



Shell and Core



MEP



Structure